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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/627,962	07/28/2003	Olli Piirainen	59643.00281	2270
32294	7590	10/25/2006	EXAMINER	
SQUIRE, SANDERS & DEMPSEY L.L.P.			LEE, SIU M	
14TH FLOOR			ART UNIT	
8000 TOWERS CRESCENT			PAPER NUMBER	
TYSONS CORNER, VA 22182			2611	

DATE MAILED: 10/25/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/627,962

Applicant(s)

PIIRAINEN ET AL.

Examiner

Siu M. Lee

Art Unit

2611

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 July 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5, 8-12, 15 and 16 is/are rejected.
- 7) ☒ Claim(s) 6, 7, 13 and 14 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 7/28/2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Drawings

1. New corrected drawings in compliance with 37 CFR 1.121(d) are required in this application because the number labels are unreadable. Applicant is advised to employ the services of a competent patent draftsman outside the Office, as the U.S. Patent and Trademark Office no longer prepares new drawings. The corrected drawings are required in reply to the Office action to avoid abandonment of the application. The requirement for corrected drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yang (US 6,504,862 B1) in view of Wright et al (US 2002/0101936 A1).

(1) Regarding claims 1, 8 and 15:

Yang discloses a method of reducing a peak-to-mean ratio of a multi-carrier signal comprising the steps of generating a residual signal from a multicarrier signal (254 "composite CDMA IF signal" in figure 6), the residual signal (clipping error signal, column 12, lines 12-15) and representing a difference between the multicarrier signal

and a hard-clipped multicarrier signal (column 11, lines 65-67) (column 12, lines 1-15); and combining the minimized residual signals (shaped error signal at 336 in figure 6) and the multicarrier signal (summing junction 350 of the shaped error signal and the delayed composite CDMA IF signal) (column 12, lines 57-57).

Yang fails to disclose application of a least squares function to the residual signal for at least one carrier of the multi-carrier signal, thereby generating a minimized residual signal for the at least one carrier.

However, Wright et al. discloses a de-cresting pulse generating circuit that apply a least squares function (pulse generator control 1008 and pulse generator 1502 in figure 15) to a signal (channel inputs in figure 5) for at least one carrier of the multi-carrier signal (channels input to pulse generator control 1008), thereby generating a minimized residual signal (output of the block 1510 in figure 5) for the at least one carrier (figure 15, paragraph 149-paragraph 154).

It is desirable to use the teaching of Wright et al. to apply a least squares function (de-cresting pulse generation circuit) for at least one carrier of the multi-carrier signal, thereby generating a minimized residual signal for the at least one carrier because the de-cresting pulse generation circuit provides multiple band-limited pulses to de-crest the composite multicarrier signal with relatively little pollution of the frequency spectrum (paragraph 146, lines 2-6). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to replace the shaping filter of Yang with the de-cresting pulse generation circuit of Wright et al. to improve the accuracy of the residual signal.

(2) Regarding claims 2 and 9:

Wright et al. further discloses a step of, prior to the step of combining the minimized residual signals (summing circuit 1514 in figure 15), filtering at least one minimized residual signal (block 1512 in figure 15) (paragraph 155-156).

(3) Regarding claims 3 and 10:

Yang discloses the step of delaying the multicarrier signal (the composite CDMA IF signal 254 is being delayed by the delay element 344 in figure 6), wherein the delayed multicarrier signal is combined with the minimized residual signal (the delayed composite CDMA IF signal is summed with the inverted shaped difference signal) (column 12, lines 46-57).

(4) Regarding claims 4 and 11:

Yang discloses a method wherein the step of generating the residual signal (clipping error signal) includes a step of clipping the multicarrier signal (composite CDMA IF signal in figure 6) to a predetermined level (clipping level determine by the clipping level calculation unit 318 in figure 6) to thereby generate the hard-clipped multicarrier signal (column 11, lines 65-67).

(5) Regarding claims 5 and 12:

Wright et al. further discloses the step of filtering comprises complex filtering (since the weight values from the weight generator 1506 can be complex values, therefore, the filters are complex filters) (paragraph 151, lines 8-10).

(6) Regarding claim 16:

Wright et al. further discloses that the mobile communication system wherein said generating means, said applying means and said combining means are implemented in a GSM EDGE mobile communication system (the invention can be applied to both wire and wireless communication system such as cellular) (paragraph 13, lines 3-6).

It is desirable to use the teaching of Wright et al. to reduce the peak-to-average ratio of the signal because the invention permits significant reduction to the cost (paragraph 13, lines 1-3). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to combine the teaching of Wright with the system of Yang to reduce the cost of the system.

Allowable Subject Matter

3. Claims 6-7 and 13-14 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

The present invention discloses a PAR reduction for EDGE clipper that the step of filtering comprises a step of multiplying the residual signal by a projection matrix of a spanned signal space of the at least one carrier. The step of filtering further defined to comprise a step of applying the residual signal for at least one carrier, a matrix function, a sampling function, a filtering function and an interpolation function. The closest prior art Yang (US 6,504,862 B1) and Wright et al. (US 2002/0101936 A1) show a similar

system but fail to disclose the filtering step comprises multiplying the residual signal by a projection matrix of a spanned signal space of the at least one carrier and further defined to comprise a step of applying the residual signal for at least one carrier, a matrix function, a sampling function, a filtering function and an interpolation function. The distinct features have been added to the independent claims 6-7 and 13-14, therefore, rendering them allowable.

Conclusion

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. McCallister et al. (US 6,366,619 B1) discloses a constrained-envelope transmitter and method therefor. Suzuki et al. (US 6,392,483 B2) discloses a feed-forward amplifier. McGowan et al. (US 6,687,511 B2) discloses a CDMA transmit peak power reduction. Jo et al. (US 2003/0054851 A1) discloses an apparatus and method for controlling transmission power in a mobile communication system. Kim et al. (US 2003/0086507 A1) discloses a peak limiting architecture and method. Birchler et al (US 5,638,403) discloses a low-splatter peak-to-average signal reduction with interpolation. Morris (US 2004/0203430 A1) discloses a peak power reduction using windowing and filtering. Booth et al. (US 7,054,385 B2) discloses a reduction of average-to-minimum power ratio in communication signals.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Siu M. Lee whose telephone number is (571) 270-1083.

The examiner can normally be reached on Mon-Fri, 7:30-4:00 with every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh Fan can be reached on (571) 272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Siu M. Lee
10/13/2006



CHIEH M. FAN
SUPERVISORY PATENT EXAMINER